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A CHOICE MODELING APPROACH TO PREDICT ENTREPRENEURIAL INTENTIONS FROM ATTITUDES AND PERCEIVED ABILITIES

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ABSTRACT

We are interested in the antecedents to an individual's decision to become an entrepreneur. Our approach is to consider an individual's choice between self-employment and becoming an employee using multi-attribute utility discrete-choice modeling. The attributes in the model are based on the economic factors as previously identified in the entrepreneurship literature, with an individual's utility function based on their preferences for income, risk exposure, work effort, independence and ownership (entrepreneurial attitudes). Our point of departure is to use market simulation techniques developed in marketing, to study an individual's intention to become self employed by explicitly relating an individual's beliefs concerning feasible employment options (their choice set) to their perceived abilities (self-efficacy). We test the model using a survey of 414 MBA students in Thailand, China, India and Australia. We find support for the theoretical approach to the discrete-choice modeling of entrepreneurial intentions. We find that the difference in perceptions of income and independence between self-employment and employment influence an individuals' entrepreneurial intentions. Further, we find that individuals with low entrepreneurial self-efficacy expect income to be higher for employment, but expected income for self-employment relative to employment increases as self-efficacy increases. We find no support for perceptions of risk and work effort influencing intentions.

INTRODUCTION

Understanding the reasons why individuals seek self-employment over employment has been an important line of enquiry in entrepreneurship research. Early work was dominated by psychological and sociological approaches to understanding this question (e.g. Katz, 1992). More recently, a stream of research incorporating individual cognitions and motivating factors has examined entrepreneurship as a utility-maximizing response (Douglas & Shepherd, 2000; Eisenhauer, 1995). This literature argues that an individual will form an intention to become an entrepreneur based on their attitudes relevant to entrepreneurship being their attitudes held towards greater decision-making autonomy, ownership of a firm, risk, hard work, and perquisites that tend to be associated with self-employment as compared to employment.

Building on the early work of Campbell (1992) and Eisenhauer (1995), Douglas and Shepherd (2000) employ a utility-maximising approach to career choice (self-employment versus employment) utility of any career option as being determined by an individual's entrepreneurial attitudes or preferences for income, work effort, independence, risk and other working conditions. Subsequently, they empirically test this model using a conjoint analysis approach to predict entrepreneurial intentions (Douglas & Shepherd, 2002).

Other research reveals entrepreneurial self-efficacy (perception of abilities) strongly influences entrepreneurial intentions and behavior (Boyd & Vozikis, 1994; Chen, Greene, & Crick, 1998; De Noble, Jung, & Ehrlich, 1999; Markman, Balkin, & Baron, 2002). Accordingly, Douglas and Fitzsimmons (2005) regard entrepreneurial self-efficacy and entrepreneurial attitudes as independently influencing entrepreneurial intentions. However, it is reasonable to assume that entrepreneurial self efficacy directly influences the expected utility of self employment by impacting the individual's beliefs (anticipated income, risk and work effort, for example) regarding self employment.

In this paper, we combine both entrepreneurial attitudes and perceived abilities into a utility maximizing framework. Our approach is based on multi-attribute utility discrete-choice modelling (see Green and Srinivasan 2000 and Green, Kreiger and Wind, 2001 for recent reviews). The attributes in the model are based on the economic factors as previously identified in the entrepreneurship literature above, with an individual's utility function based on their preferences (entrepreneurial attitudes). Our point of departure is that an individual's beliefs (anticipated income, risk and work effort) for feasible employment options (their choice set) are explicitly related to their perceived abilities (self-efficacy). Choice simulation techniques developed in the marketing literature (e.g. Green, Krieger, & Vavra, 1997; Srinivasan, 1974) can then be used to model an individual's career intentions towards self-employment versus employment.

We first review the literature on the antecedents of entrepreneurial intentions and the various models that have been used to predict an individuals' entrepreneurial intention. Following that, we outline our reasoning for pursuing the discrete choice modeling approach and develop our theoretical model and hypotheses. In our method section we outline our approach for the study and present the findings of the comparison between the two models. Finally we discuss the implications of the results of the model and present our conclusions from the study.

ENTREPRENEURIAL INTENTIONS

Previous research has investigated the various economic and psychological motivations of individuals to seek self-employment (e.g. Baumol, 1990; Douglas & Shepherd, 2000; Eisenhauer, 1995). The motivation to engage in entrepreneurial behavior has generally been investigated in terms of entrepreneurial intentions, with intentions conceptualised as being a function of beliefs that in turn can lead to subsequent behavior (Fishbein & Ajzen, 1975). In general, the greater the intention, the stronger is the motivation to engage in entrepreneurial behavior (Ajzen, 1991).

A number of models have been proposed to explain the relationship between an individual's personal characteristics and subsequent intentions (e.g. Bird, 1988; Boyd & Vozikis, 1994; Krueger & Brazeal, 1994; Shapero, 1982). Ajzen's theory of planned behavior (Ajzen, 1991) suggests three key attitudes that predict intentions, these being attitudes towards the act, social norms and perceived behavioral control. Krueger & Brazeal (1994) suggest that the perceived behavioral control construct overlaps with the self-efficacy construct of Bandura (1986), and outlined a model of potential entrepreneurship that incorporated entrepreneurial intentions. Basing their model on Ajzen's theory of planned behavior and Shapero's model of the entrepreneurial event (Shapero, 1982), their model included potential for both enterprise development and corporate ventures and was comprised of three constructs, these being: perceived desirability, perceived feasibility and propensity to act. Perceived desirability was seen to be related to intrinsic rewards associated with entrepreneurship and includes the 'attitude towards the act' and 'social norms' (Krueger & Brazeal, 1994). Perceived desirability is related to the motivational factors to engage in entrepreneurial behavior and can therefore be considered a function of entrepreneurial attitudes held by the individual. Perceived feasibility on the other hand, is related

individuals' perceptions of their ability to implement the required behavior and is seen by Kreuger & Brazeal (1994) to overlap with Bandura's construct of self-efficacy.

An alternative model of entrepreneurial intentions was proposed by Bird (1988). Based on established theory in cognitive psychology, the model suggests that an individual's entrepreneurial intention is based on a combination of personal and contextual factors. Personal factors include prior experience as an entrepreneur, personality characteristics and abilities while contextual factors consist of social, political and economic variables (Bird, 1988). An individual's intention is further structured by both rational or analytic thinking (goal-directed behavior) and intuitive or holistic thinking (vision). Boyd and Vozikis (1994) expand on this model to incorporate the perceived behavioral control aspect of Ajzen's theory of planned behavior through the inclusion of the concept of self-efficacy. Perceived behavioral control describes the perceived ease or difficulty of performing a behavior and as pointed out by (Kreuger & Brazeal, 1994) is closely related to the concept of self-efficacy. Boyd and Vozikis (1994) proposed self-efficacy as an important explanatory variable in determining the strength of entrepreneurial intentions and the likelihood that those intentions will result in entrepreneurial actions. The revised model of Boyd and Vozikis (1994) based on Bird's (1988) model suggests that intentions are a function of self-efficacy in addition to attitudes and perceptions regarding the creation of a new venture through rational and intuitive thought processes.

The perceived feasibility is related to an individual's self-efficacy. Bandura (1982) suggests that self-efficacy is the belief in one's own ability to perform a given task and that individuals having higher self-efficacy are more likely to exploit an opportunity. A number of studies have shown that entrepreneurs have greater self-efficacy than other managers (e.g. Baron & Markman, 1999; Chen et al., 1998; Hull, Bosley, & Udell, 1980). Chen et al. (1998) developed a scale to measure tasks specific to entrepreneurship and found that their entrepreneurial self-efficacy scale was positively correlated with a scale measuring the person's intention to set up their own business.

Entrepreneurial Attitudes

The motivation to behave entrepreneurially is related to the perceived desirability of behaving entrepreneurially and can be explained by the utility-maximizing theory of entrepreneurial behavior where an individual is motivated to become self-employed (or otherwise behave entrepreneurially) because that course of action promises the greatest psychic utility (Douglas & Shepherd, 2000; Eisenhauer, 1995). Underlying this motivation is the strength of the individual's abilities (human capital) and their attitude to elements provided by entrepreneurship, which include autonomy, risk, work effort, income, and net perquisites. In general, individuals desiring more income, more independence, and more net perquisites are more likely to want to engage in entrepreneurial behavior. Likewise, an individual with a higher tolerance for risk and less aversion to work effort should be expected to be more likely to want to engage in entrepreneurial behavior (Douglas & Shepherd, 2000). Douglas and Fitzsimmons (2005) distinguish between an individual's attitude towards decision-making autonomy (reflecting need for independence) and the individual's attitude toward ownership (reflecting need for achievement and/or need for recognition) and find that attitude to ownership is a better predictor of entrepreneurial intentions than is independence.

Empirical evidence has shown that the above mentioned attitudes impact to varying extents when individuals form the intention to be self-employed. Substantial research indicates that entrepreneurial individuals are generally more risk tolerant and desire more independence than less entrepreneurial individuals (e.g. Begley, 1995; Caird, 1991; Sexton & Bowman, 1984). Douglas and Shepherd (2002) found that attitudes to independence, risk and income are related to the individual's intention to be self-employed. Similarly, Douglas and Fitzsimmons (2005) found evidence that attitudes to ownership, independence and income were related to the individual's intention to engage in entrepreneurial behavior.

Some evidence was found that suggested more-risk-tolerant individuals are more likely to form the intention to be self-employed, while no evidence was found to suggest that more-work-tolerant individuals have greater intentions to be self-employed.

DISCRETE CHOICE MODELING

Conjoint analysis is a class of associated techniques for analysing and measuring consumer choices between discrete alternatives that has a long standing in both marketing theory and practice (See reviews by Green, Krieger, & Wind, 2001; Green & Srinivasan, 1978, 1990; Shocker & Srinivasan, 1979).

Conjoint analysis is founded on multi-attribute utility or random utility theory emerging from the economic psychology literature (Fishburn, 1968; Luce & Tukey, 1964). It assumes that a specific product or service can be considered as a bundle of attributes (e.g. price, quality, etc.). The utility (value) provided to an individual is determined by the desirability of each product attribute and the individual's importance weight for each attribute plus an error component. In many applications a linear function is assumed:

$$V_i = w_1 y_{i1} + w_2 y_{i2} + \dots + w_n y_{in}$$

$$V_i = \sum_{j=1}^n w_j \times y_{ij} \tag{1}$$

And,

$$U_i = V_i + \varepsilon_i \tag{2}$$

where V_i is the strict (deterministic) component of utility of product i , w_j is the weight (or importance) of attribute j that need to be estimated, and y_{ij} is the perceived level of attribute j for product i . U_i is the utility of product i , with ε_i the random component due to random disturbances and omitted attributes. Typically, the weights w_j vary between consumers.

Conjoint analysis refers to any decompositional¹ (or revealed preference) method that estimates consumers' preference structure (w_j s above) based on their overall evaluation of a set of alternatives ($j = 1$ to n above) that have pre-specified levels of the attributes (y_{ij} 's above) (Green et al., 2001). Techniques differ in terms of the specification of the utility model, the data collection method (full profile versus two-at-a-time trade-offs), the measurement scale (comparisons, rankings or ratings) and the associated estimation techniques.

Green and Srinivasan report that one of the main reasons for the popularity of conjoint approaches in marketing is the ability to use choice simulators. These simulators are used to evaluate the market potential of a new product and/or determine optimal positioning of the new product (Green, Carroll, & Goldberg, 1981; Green & Krieger, 1985, 1989; Green et al., 1997; Shocker & Srinivasan, 1979; Srinivasan, 1974). Again, several specific approaches are used, but a popular approach is to use the logit model, which can be derived from the random utility model above with appropriate distribution of the error term:

¹ As apposed to a compositional (stated preference) methods, such as Fishbein expectancy-value approaches (e.g. Lancaster 1971), where both the importance weights and perceived attributes are separately and explicitly judged by the respondent.

$$\pi_i = \frac{\exp(V_i)}{\sum_{j=1}^n \exp(V_j)} \quad (3)$$

SIMULATING ENTREPRENEURIAL CHOICE

Earlier studies of entrepreneurial intention have used a conjoint analysis approach to elicit the preference structure of the self-employment versus employment choice of individuals. Douglas and Shepherd (2002) for example, used an experimental approach to elicit an individuals' preference for attributes associated with employment choice by asking individuals to rate the career attractiveness of a number of hypothetical scenarios. Specifically, the importance weights (w_i s in Equation 1) were determined for five attributes associated with entrepreneurial behavior being income, risk, work effort, independence and ownership (Douglas & Fitzsimmons, 2005; 2002).

Conjoint analysis has been widely used as a method to investigate the trade-offs individuals make in multi-attribute decision making and has been widely used in the marketing field (Hair, Anderson, Tatham, & Black, 1998). Marketing simulation approaches would normally use this understanding of consumers' preference structure generated from conjoint analysis, and a model such as the logit model (Equation 3) to predict consumer choices between a set of alternative products (in our case self-employment and employment). To do so requires knowledge of each alternative product's attributes – the y_{ij} s in Equation 1. Unfortunately, we do not know perceived income, risk and work effort, nor to a lesser extent independence, for the two alternatives.

Our point of departure is to consider an individual's beliefs (income, risk exposure, work effort, independence and ownership) about their feasible employment options (their choice set) as explicitly related to their perceived abilities (self-efficacy). A choice model is then used to determine an individual's career intentions towards self-employment versus employment. We measure consumer choice (stated intention to become self-employed) and estimate the product attributes (y_{ij} s) – that is anticipated income, risk exposure, work effort and independence of both self employment and employment. Moreover, we expect these beliefs to vary according to each consumer's self-efficacy. Below, we develop some specific hypotheses regarding these beliefs.

Individuals with higher self-efficacy are more likely to exploit opportunities than individuals with lower self-efficacy (Shane, 2003: 111). Given that previous studies have shown income to be a significant factor in determining career desirability (e.g. Douglas & Shepherd, 2002), it is likely that individuals with higher self-efficacy perceive greater income benefits from self-employment than from employment. This can also be greater individuals with higher self-efficacy may believe they can influence the performance of the venture. Alternatively, individuals with lower self-efficacy might be expected to have lower expectations of income benefits from self-employment. As such, we hypothesise that:

H1a: For people with low entrepreneurial self-efficacy, anticipated income is lower for self-employed than employed.

H1b: For people with high entrepreneurial self-efficacy, anticipated income is higher for self-employed than employed.

H1c: The difference between anticipated income of self-employment and employed increases with entrepreneurial self efficacy.

It would also be expected that individuals recognise that self-employment carries significantly more risk than employment. However, individuals with higher self-efficacy may feel that they are capable of

managing these risks in the venture and perceive these risks to be lower. These perceived risks may be lower if they have previous entrepreneurial experience, specific knowledge or access to social networks to manage risks (Janney & Dess, 2005). Subsequently, we hypothesize that:

H2a: Anticipated risk is higher for self-employed than employed.

H2b: The difference between anticipated risk of self-employment and employed decreases with entrepreneurial self- efficacy.

Finally, individuals undertaking an entrepreneurial venture generally recognise that hard work is required for success, irrespective of their perceived abilities. In addition, the desire for independence is a factor influencing individuals to pursue self employment over employment. The utility or satisfaction in being self-employed should be the same regardless of their perceived abilities. Therefore, we hypothesise that:

H3a: Anticipated work effort is higher for self-employed than employed.

H3b: The difference between anticipated work effort of self-employment and employed decreases does not change with entrepreneurial self- efficacy.

H4a: Anticipated independence is higher for self-employed than employed.

H4b: The difference between anticipated independence of self-employment and employed does not change with entrepreneurial self- efficacy.

We now specify the choice model. Use Equation 1 and the five attributes, the (deterministic component of) utility of self-employment ($V_{SE,k}$) and employment ($V_{EMP,k}$) for respondent k are given by:

$$V_{SE,k} = w_{own,k} + w_{Inc,k} Ind_{SE,k} + w_{Wrk,k} Wrk_{SE,k} + w_{Inc,k} Inc_{SE,k} + w_{Rsk,k} Rsk_{SE,k} \quad (4)$$

$$V_{EMP,k} = 0 + w_{ind,k} Ind_{EMP} + w_{Wrk,k} Wrk_{EMP,k} + w_{Inc,k} Inc_{EMP,k} + w_{Rsk,k} Rsk_{EMP,k} \quad (5)$$

where $w_{Attribute,k}$ are the importance weights for respondent k, $Attribute_{SE,k}$ is the anticipated level of that attribute for self-employment and $Attribute_{EMP,k}$ is the anticipated level of that attribute for employment.

We assume the anticipated independence and work effort of both self employment and employment are constant, but the anticipated income and risk increase linearly with entrepreneurial self efficacy.

$$Ind_{SE,k} = AInd_{SE} \quad (6a)$$

$$Wrk_{SE,k} = AWrk_{SE} \quad (6b)$$

$$Inc_{SE,k} = AInc_{SE} + BInc_{SE} \times SelfEff_k \quad (6c)$$

$$Rsk_{SE,k} = ARsk_{SE} + BRsk_{SE} \times SelfEff_k \quad (6d)$$

$$Ind_{EMP,k} = AInd_{EMP} \quad (7a)$$

$$Wrk_{EMP,k} = AWrk_{EMP} \quad (7b)$$

$$Inc_{EMP,k} = AInc_{EMP} + BInc_{EMP} \times SelfEff_k \quad (7c)$$

$$Rsk_{EMP,k} = ARsk_{EMP} + BRsk_{EMP} \times SelfEff_k \quad (7d)$$

where $SelfEff_k$ is the entrepreneurial self efficacy for respondent k, and all the As and Bs are parameters to be estimated.

Applying the choice model (3) to consumer k, we get:

$$\pi_{SE,k} = \frac{\exp(V_{SE,k})}{\exp(V_{SE,k}) + \exp(V_{EMP,k})} \quad (8)$$

METHOD

We employ a discrete-choice modeling approach (Green et al., 2001; Green & Srinivasan, 1990) to combine both entrepreneurial attitudes and self-efficacy into a utility-maximizing framework to predict entrepreneurial intentions. We survey a large sample of MBA students. We obtain measures of their entrepreneurial attitudes (preference for income, risk exposure, work effort, independence and ownership) using conjoint analysis. We also measure their entrepreneurial self efficacy and entrepreneurial intentions (as a proxy for entrepreneurial behavior). We use constrained non-linear regression to estimate a discrete choice model of their entrepreneurial intentions (intended career choice).

Sample

We measured entrepreneurial attitudes and abilities and related these to entrepreneurial intentions for a large sample of MBA students. The sample consists of 414 students surveyed at the beginning of their first entrepreneurship class in MBA programs in Australia, China, India and Thailand (46, 39, 204 and 125 students respectively). These individuals may be considered potential entrepreneurs, since they are approaching a career decision point at which they might either enter into employment or seek self-employment. The sample for each country was generally similar in characteristics such as age, work experience and prior educational background which allowed us to focus on other aspects relating to their motivation, perceived entrepreneurial abilities and their entrepreneurial intentions.

Entrepreneurial Intentions

We measured entrepreneurial intentions of the students in the sample using a 7-point scale ranging from very unlikely (“1”) to very likely (“7”) for four items measuring intentions to engage in a range of entrepreneurial behavior. In addition to asking how likely it was that they would start their own firm within two years or at any time in the future, two items related to entrepreneurial intentions involving the exploitation of a radical innovation or the exploitation of an incremental innovation. Our measure of entrepreneurial intentions was the average of these four items ($\alpha=0.79$).

Entrepreneurial Attitudes

Conjoint analysis was used to obtain measures for the entrepreneurial attitudes of individuals in the sample. The individuals were asked to evaluate a series of hypothetical career profiles and decide on the attractiveness of each profile presented. Based on a career scenario provided, respondents were asked to rate the attractiveness of that career alternative (assumed to be available within two years of graduation) on a seven point Likert scale anchored by very low attractiveness (“1”) to very high attractiveness (“7”). The hypothetical scenarios presented were based on five attributes, these being income, risk, work effort, independence and ownership. The resulting preference weights were used as a measure of the importance that individuals placed on each attribute in determining career desirability. The individuals’ entrepreneurial intentions score was then regressed on the five attributes to determine the degree to which each of the attributes contributes to the individuals’ entrepreneurial intentions. Further details on the experimental method can be found in Douglas and Shepherd (2002).

Entrepreneurial Self-Efficacy

The entrepreneurial self-efficacy scale developed by Chen, Greene and Crick (1998) was used for the present study. This scale consists of 22 items measuring an individual’s abilities in performing entrepreneurial tasks with each item measured on a 5 point Likert scale ranging from completely unsure (“1”) to completely sure (“5”). Following Chen et al. (1998), we calculated the total entrepreneurial self-efficacy score by taking the average of the 22 items.

Comparison Model

To allow a comparison of our discrete choice modeling approach to predict entrepreneurial intentions with the regression approach of previous work (Douglas & Fitzsimmons, 2005; Douglas & Shepherd, 2002), we perform two regressions. In Model 1 we regress entrepreneurial intentions against entrepreneurial attitudes (preference for income, risk exposure, work effort, independence and ownership). In Model 2, we introduce self efficacy into the regression. We include dummy variables for country.

Choice Model Estimation

We use stated intention as a proxy variable for behavior. We model stated intention as proportional to the probability an individual will choose to become self employed. We also include a dummy variable to capture country variations:

$$I_{SE,k} = \alpha (1 + \text{country}_k) \pi_{SE,k} \quad (9)$$

Substituting into Equation (8) and rearranging we get:

$$I_{SE,k} = \frac{\alpha (1 + \text{country}_k)}{[1 + \exp(V_{EMP,k} - V_{SE,k})]} \quad (10a)$$

And substituting for Equations (6) and (7) we get:

$$\begin{aligned} V_{SE,k} - V_{EMP,k} = & w_{own,k} + w_{ind,k} (AInd_{SE} - AInd_{EMP}) \\ & + w_{Wrk,k} (AWrk_{SE} - AWrk_{EMP}) \\ & + w_{Inc,k} [(AInc_{SE} - AInc_{EMP}) + (BInc_{SE} - BInc_{EMP}) \text{SelfEff}_k] \\ & + w_{Rsk,k} [(ARsk_{SE} - ARsk_{EMP}) + (BRsk_{SE} - BRsk_{EMP}) \text{SelfEff}_k] \end{aligned} \quad (10b)$$

The ws for each respondent are estimated using conjoint analysis as described earlier. The parameters of Equation (10), the differenced As and Bs, are estimated using constrained non-linear regression. We used a sequential quadratic programming routine (the CNLR module of SPSS), minimising the sum of squares error and using numerically estimated derivatives.

RESULTS

The descriptive statistics and correlation matrix for the sample are shown in Table 1. The parameter estimates and overall fit for the comparison regression models of entrepreneurial intentions are displayed in Table 2. Model 1 excludes self efficacy. The overall fit is reasonable ($R^2 = 0.22$). Model 2 introduces self efficacy which improves the model fit ($R^2 = 0.26$) and is statistically significant ($\Delta R^2 = 0.042$; $\Delta F = 22.0$ sig at 0.001). The regression coefficient of the importance weight for ownership is strongest, followed by independence and income, which are all highly significant. The regression coefficients of importance weights for work effort and risk are not significant. The influence of self efficacy is also strong and highly significant.

INSERT TABLES 1 & 2 ABOUT HERE

The parameter estimates and overall fit the non-linear regression of the choice model (10) are displayed in Table 3. The overall model fit is quite good ($R^2 = 0.26$). Comparison of Tables 2 and 3 reveals an almost identical overall fit between the discrete choice model and the linear regression model. We conclude that the functional form of the discrete choice model is neither superior or inferior to linear regression in terms of modeling an individual's entrepreneurial intentions. However, the functional form

has superior theoretical validity. Hence, the equivalent model fit provides justification for the use of the model. Importantly, the parameter estimates in the discrete-choice model are easily interpreted as described below.

INSERT TABLE 3 ABOUT HERE

The estimate for anticipated ownership (for self employment compared with employment) was large (0.58) and significant. Although it is a tautology that self employment provides higher level of ownership, this result provides further confidence in the overall model structure. The estimate for anticipated independence (for self employment compared with employment) was smaller, but highly significant. This provides support for hypothesis H4.

The estimates relating to anticipated income are significant and in the directs expected, providing support for H1a, H1b and H1c. The estimate of $BInc_{SE} - BInc_{EMP}$, which relates to the increase in anticipated income (for self employment compared with employment) with self efficacy is positive (0.130) and significant, directly confirming hypothesis H1c. $AInc_{SE} - AInc_{EMP}$ is negative (-0.322) and significant. This implies that for individuals with very low self efficacy, anticipated income is lower for self employment compared with employment ($-0.322 + 1 \times 0.130 = -0.192$), providing support for H1a. Similarly, for individuals with very high self efficacy, anticipated income is higher for self employment compared with employment ($-0.322 + 5 \times 0.130 = 0.328$), providing support for H1b.

The estimates for anticipated work effort, risk exposure and risk exposure variation with self efficacy were all non-significant. No support is provided for hypotheses H2 and H3.

DISCUSSION AND CONCLUSIONS

In this paper we set out to examine how attitudinal antecedents combine with self efficacy to influence the intention to behave entrepreneurially. To do so, we borrow the discrete choice modeling approach from the marketing literature to model an individual's choice between employment and self employment. Each individual's entrepreneurial preferences (importance weights for income, risk exposure, work effort, independence and ownership) are measured using conjoint analysis. Their beliefs regarding feasible career options are estimated using the choice model of entrepreneurial intentions, hypothesizing that anticipated income and risk exposure vary with entrepreneurial self efficacy.

We find that the discrete choice modeling approach provides a reasonable description of an individual's entrepreneurial intentions explaining about 25% of the variance. Due to their superior theoretical justification, we advocate researchers employ discrete choice models rather than linear functional forms for analyzing or predicting entrepreneurial intentions and behavior. In particular, the model parameters using a discrete choice approach are more easily interpreted.

We find support that preferences / anticipated differences for ownership and independence explain differences in an individual's intention to become self employed. These findings are reinforce earlier empirical research (Douglas & Shepherd, 2002).

At odds with the findings of Douglas and Shepherd, we found support for the influence of income. Moreover, we extended previous work to look at the influence of self efficacy on an individual's utility function for employment and self employment. We confirm our hypothesis that anticipated income from self employment (relative to employment) increases for individuals with higher entrepreneurial self efficacy. Indeed, individuals with very low entrepreneurial self efficacy expect higher income from employment.

We found no support for the influence for risk exposure and work effort. While the lack of support for the influence of work effort is in line with earlier work, Douglas and Shepherd (2002) found support for the influence of risk exposure.

We might speculate that the differences reported compared with earlier research is due to country differences – our study is dominated by Asian countries, whereas the Douglas and Shepherd (2002) study is a US study. However, further research is required to determine whether the differences we report are due to country differences, model specification or other factors.

We would like to highlight a number of limitations of the current research. First, as our empirical research was confined to a sample of MBA students, the generalizability of results to the wider population is not studied. While MBA student's entrepreneurial behavior represent a legitimate research interest in its own right, this sample is not likely to be representative of the general population. The motivation to undertake an MBA is likely to be highly correlated to motivations for career choice – the focus of this investigation. Second, since our research used a cross-sectional design, our dependent variable was intended entrepreneurial behavior – whereas our real interest is actual entrepreneurial behavior. Of course, this is a limitation common to all cross sectional research, and made as a trade-off against data collection and research costs, response rates, and expediency of longitudinal designs. Finally, the country sample sizes were too small to allow comprehensive comparisons of the model.

Future research in this area could test the generalizability of these results to the general population, explore cross-country differences and undertake longitudinal designs to examine subsequent entrepreneurial behavior. Anticipated levels of career attributes (i.e. income, risk exposure, work effort and independence) could also be directly measured through self explicated ratings. These could be compared with the revealed estimates derived in this study.

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Table 1. Descriptive statistics and Inter-correlation matrix

	Mean	S.d.	1	2	3	4	5	6
1. Intentions	5.38	1.26						
2. Income	2.74	0.91	0.03					
3. Independence	1.10	0.72	0.11*	-0.35**				
4. Ownership	0.33	0.63	0.39**	-0.25**	0.00			
5. Risk Tolerance	-0.51	0.60	0.13**	-0.17**	0.29**	0.15**		
6. Work Effort	-0.13	0.62	-0.01	-0.19**	0.23**	-0.00	0.33**	
7. ESE	3.79	0.53	0.21**	0.04	0.12*	0.01	0.09	0.13*

* $p < 0.05$, ** $p < 0.01$

Table 2: Linear Regression Results for Comparison Models

Variable	Model 1 Excluding Self Efficacy		Model 2 Including Self Efficacy	
	Unstandardised Co-efficient	Standard Error	Unstandardised Co-efficient	Standard Error
Intercept	4.153***	.299	2.428***	.470
Importance Weights				
Ownership w_{Own}	.851***	.096	.818***	.094
Income w_{Inc}	.274***	.070	.231***	.069
Work Effort w_{Wrk}	-.032	.101	-.070	.099
Independence w_{Ind}	.365***	.093	.340***	.091
Risk w_{Rsk}	.139	.105	.124	.102
Self Efficacy	—	—	.508***	.108
Country Dummy Variables				
China	-.057	.253	-.052	.247
India	-.273	.197	-.393*	.194
Thailand	.001	.205	.003	.200
Model Fit				
R Squared	0.215		0.257	
Adjusted R Squared	0.199		0.240	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, $n = 399$

Table 3: Non-Linear Regression Results for Choice Model

Parameter	Unstandardised Co-efficient	Asymptotic Standard Error
Scaling Parameter (α)	1.122***	0.088
<i>Anticipated Level of Attributes</i>		
Ownership	0.582***	0.131
Independence: $AInd_{SE} - AInd_{EMP}$	0.238***	0.084
Work Effort: $AWrk_{SE} - AWrk_{EMP}$	-0.056	0.061
Income constant: $AInc_{SE} - AInc_{EMP}$	-0.322**	0.131
Income increase with self efficacy: $BInc_{SE} - BInc_{EMP}$	0.130***	0.041
Risk constant: $ARsk_{SE} - ARsk_{EMP}$	-0.414	0.451
Risk increase with self efficacy: $BRsk_{SE} - BRsk_{EMP}$	0.130	0.120
<i>Country Dummy Variables</i>		
China	-0.007	0.045
India	-0.055	0.034
Thailand	0.003	0.037
<i>Model Fit</i>		
R Squared	0.258	
Adjusted R Squared	0.241	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, $n = 399$